

Gamma Detector Modular Assemblies for EXIST, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



ABSTRACT

The Energetic X-ray Imaging Survey Telescope (EXIST) is a proposed mission that aims to detect faint high energy X-ray sources in the energy range 10 - 600 keV. The concept for EXIST relies on an X-ray telescope imaging the entire sky each 95 min orbit. The core of the X-ray imaging telescope comprises approximately 8 square meters of pixilated Cd-Zn-Te (CZT) detectors, a technical feat never before attempted. This enormous array requires development of a new packaging technology for CZT detector arrays, one that allows detectors to be abutted together into large arrays of CZT tiles, with minimal dead space in between detectors. Also required is a technology that can produce these detectors with a high interconnection yield, not currently achieved with indium bump technologies. We propose an innovative technique to assemble CZT X-ray sensors avoiding conventional direct indium bump hybridization used today. The novel scheme incorporates commercial off-the-shelf flip-chip and multichip module technologies, combined with new flip-chip bonding materials and proprietary processes developed at Aguila under previous NASA sponsorship. This will result in novel detector modules containing fully-integrated readout electronics that can be implemented into a large-array motherboard.



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Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Technology Areas

Primary Technology Area:

Science Instruments, Observatories, and Sensor Systems (TA 8)

└ In-Situ Instruments and Sensors (TA 8.3)

└ Field and Particle Detectors (TA 8.3.1)

└ Energetic Neutral Particle Sensor (TA 8.3.1.4)

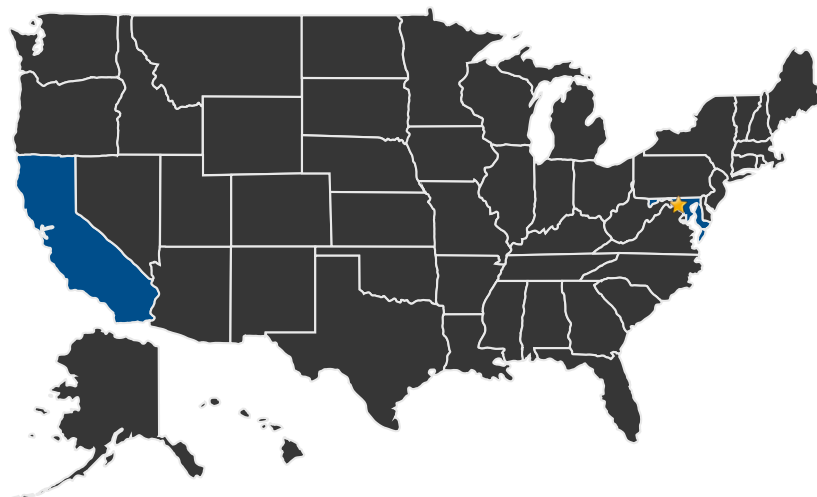
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U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ **Lead Center:**
Goddard Space Flight Center

Other Organizations Performing Work:

- AGUILA TECHNOLOGIES INC. (SAN MARCOS, CA)

DETAILS FOR TECHNOLOGY 1

Technology Title

Gamma Detector Modular Assemblies for EXIST

Technology Areas (cont.)

Secondary Technology Area:

Human Health, Life Support, and
Habitation Systems (TA 6)

└ Radiation (TA 6.5)